INST F. PLASMAE

SCAN

PRODUCT CODE:	MAINDEC-8E-D0QA-D-(D)
PRODUCT NAME:	DR8-EA 12 CHANNEL BUFFERED DIGITAL INTERFACE
DATE CREATED:	JUNE, 1971
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	MICHAEL DAVIS

1 , ABSTRACT

THIS PROGRAM IS A DIAGNOSTIC AND EXERCISER FOR THE DR8-EA 12 CHANNEL BUFFERED DIGITAL INTERFACE. ALL FUNCTIONS ARE TESTED AND ERRORS ARE REPORTED BY HALTS AND/OR ERROR TYPEOUTS.

2 , REQUIREMENTS

2 ,1 EQUIPMENT

PDP8E STANDARD COMPUTER WITH 4K OF CORE
ASR-33 TELETYPE (OR EQUIVALENT)
DR8-EA WITH TEST CABLE

2 ,2 STORAGE

THE PROGRAM USES LOCATION 0000-3377

3 , LOADING PROCEDURE

THE STANDARD PROCEDURE FOR LOADING BINARY TAPES SHOULD BE USED.

4 , STARTING PROCEDURE

4 ,1 STARTING ADDRESS

200-INPUT DEVICE CONFIGURATION
201-START WITH STANDARD CONFIGURATION

4 ,2 SWITCH SETTINGS

FOR EITHER STARTING ADDRESS, NORMAL SETTING IS SR0-SR11-0 (DOWN).

4 ,3 PROGRAM AND/OR OPERATOR ACTION

LOAD PROGRAM INTO MEMORY
SET SWITCH REGISTER TO DESIRED STARTING ADDRESS
 LOAD ADDRESS
 CLEAR SWITCHES
 PRESS CLEAR AND CONTINUE

4',3',1 FOR STARTING ADDRESS 200

THE PROGRAM WILL TYPE "SET SR FOR DEVICE CODE AND CONT"
AND THEN HALT.

SET SWITCHES TO 00X WHERE X IS AN OCTAL
NUMBER CORRESPONDING TO THE 3 LSB OF THE DEVICE SELECTOR CODE.
PRESS CONTINUE.

PROGRAM WILL RESPOND BY TYPING
"SET SR FOR INTERRUPT JUMPERS AND CONT" AND THEN HALT.
SET SWITCHES FOR ALL INPUT REGISTER BITS JUMPERED TO INTERRUPT.
PRESS CONTINUE.

PROGRAM WILL RESPOND BY TYPING
"SET SR FOR FLIPFLOP JUMPERS AND CONT" AND THEN HALT.
SET SWITCHES FOR ALL INPUT REGISTER FLIPFLOPS.
PRESS CONTINUE.

PROGRAM WILL RESPOND BY TYPING
"SET SR FOR RUN" AND THEN HALT.
SET SWITCHES AS IN 4',2 OR 5',1
PRESS CONTINUE.

PROGRAM WILL BEGIN TEST EXECUTION

4',3',2 FOR STARTING ADDRESS 201

SET SWITCHES AS IN 4',2 OR 5',1
PRESS CLEAR AND CONTINUE.

PROGRAM WILL BEGIN TEST EXECUTION

5.0 OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

SR0=1, SUPPRESS ERROR HALT
SR1=1, SUPPRESS ERROR TYPEOUT
SR2=1, LOOP ON CURRENT TEST
SR3=1, LOOP WITH CURRENT DATA
SR4=1, SUPPRESS BELL OR TYPEOUT AT END OF PASS
SR5=1, SUPPRESS ITERATIONS
SR6=1, ESCAPE TO NEXT TEST ON ERROR

5.2 PROGRAM AND/OR OPERATOR ACTION

5.2.1.1 WITH SWITCHES SET AS IN 4.2, THE PROGRAM WILL RUN ALL TESTS SEQUENTIALLY. EACH IOT TEST WILL BE REPEATED 4096 TIMES. EACH DATA TEST WILL BE REPEATED 50 TIMES. AFTER ALL TESTS HAVE BEEN COMPLETED, THE PROGRAM WILL TYPE "DR" AND START ALL TESTS AGAIN.
IF AN ERROR OCCURS, THE PROGRAM WILL HALT AND TYPE AN APPROPRIATE ERROR MESSAGE (SEE SECTION 6 FOR DETAILS).

5.2.1.2 WITH SR0=1 (UP), PROGRAM ACTION WILL BE AS IN 5.2.1.1, EXCEPT NO TYPEOUT WILL OCCUR.

5.2.1.3 WITH SR2=1(UP) PROGRAM ACTION WILL BE AS IN 5.2.1.1, EXCEPT NO TYPEOUT WILL OCCUR. THE ADDRESS OF THE FAILING TEST WILL BE DISPLAYED IN THE COMPUTER AC.

5.2.1.4 WITH SR4=1(UP), PROGRAM ACTION WILL BE AS IN 5.2.1.1 EXCEPT NO END OF PASS TYPEOUT WILL OCCUR.

5.2.1.5 WITH SR5=1 (UP), EACH TEST WILL BE EXECUTED ONLY ONCE. INSTEAD OF TYPING "DR", THE PROGRAM WILL RING THE TTY BELL

5.2.1.6 WITH SR0=1 AND SR6=1, PROGRAM ACTION WILL BE AS IN 5.2.1.1
IF NO ERRORS OCCUR.
IF AN ERROR OCCURS, THE PROGRAM WILL TYPE AN APPROPRIATE ERROR MESSAGE AND IMMEDIATLY TERMINATE ITERATIONS OF THE FAILING TEST. THE PROGRAM WILL THEN START THE NEXT TEST IN SEQUENCE.

6. ERRORS

6.1 NORMAL OPERATION

IF AN ERROR OCCURS WITH SWITCHES SET AS IN 4.2, THE PROGRAM WILL TYPE AN APPROPRIATE ERROR MESSAGE (WITH DATA IF APPLICABLE) AND HALT.

THE FORMAT OF THE ERROR TYPEOUT IS

```
XXXX    MESSAGE
        HEADER FOR DATA (IF APPLICABLE)
        DATA            (IF APPLICABLE)
 XXXX    ADDRESS OF JMS TO ERROR ROUTINE IN TEST THAT FAILED.
```

6.2 ERROR RECOVERY

SET SR6=1(UP) TO ESCAPE TO NEXT TEST, PRESS CONTINUE.

6.3 ERROR LOOP (IOTS)

```
SET SR0=1  TO SUPPRESS HALT
SET SR1=1  TO SUPPRESS TYPEOUT
SET SR2=1  TO LOOP ON CURRENT FAILING TEST
```

6.4 ERROR LOOP (DATA)

SAME AS 6.3 EXCEPT USE SR3 INSTEAD OF SR2 TO LOOP WITH CURRENT DATA.

7. RESTRICTIONS

7.1 STARTING RESTRICTIONS

TEST JUMPER CABLE MUST BE INSTALLED.
ANY FLOATING INPUTS TO INPUT REGISTER SHOULD BE GROUNDED, OR ERRORS MAY OCCUR.

7.2 OPERATING RESTRICTIONS

NONE

8. MISCELLANEOUS

8.1 EXECUTION TIME

EXECUTION TIME IS APPROXIMATELY 3 MINUTES FOR FULL ITERATION
AND APPROXIMATELY 10 SECONDS WITH ITERATIONS SUPPRESSED.

9. PROGRAM DESCRIPTION

THE DR8-EA IS A TEST OF ALL FUNCTIONS OF THE INTERFACE.

THE PROGRAM SEQUENCE IS AS FOLLOWS:

ALL BASIC IOT TESTS ARE EXECUTED 4096 TIMES.
ALL OUTPUT REGISTER FUNCTIONS ARE TESTED WITH BINARY COUNT PATTERNS.
ALL INPUT REGISTER FUNCTIONS ARE TESTED USING BINARY COUNT PATTERNS.
INTERACTION BETWEEN INPUT AND OUTPUT REGISTERS IS TESTED FOR
WITH BINARY COUNT PATTERNS.
ALL SKIPS AND INTERRUPTS ARE TESTED USING BINARY COUNT PATTERNS.

10. LISTING

```
                        /MAINDEC-8E-D0Q
                        /DR8-EA
                        /12 CHANNEL BUFFERED I/O DIAGNOSTIC
                        /COPYRIGHT 1970, 1971, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
                        /
                        /STARTING ADDRESS:              200-INPUT DEVICE CONFIGURATION
                        /                               201-USE STANDARD CONFIGURATION
                        /
                        /SWITCH REGISTER OPTIONS
                        /
                        /SR00  =1, SUPPRESS HALT ON ERROR
                        /SR01  =1, SUPPRESS ERROR TYPEOUT
                        /SR02  =1, LOOP ON CURRENT TEST
                        /SR03  =1, LOOP WITH CURRENT DATA
                        /SR04  =1, SUPPRESS BELL AT END OF PASS
                        /SR05  =1, SUPPRESS ITERATIONS
                        /SR06  =1, ESCAPE TO NEXT TEST ON ERROR
                        /
                        /INSTRUCTION DEFINITIONS
                        /
        7421            MQL=7421
        7501            MQA=7501
        7002            BSW=7002
        6007            CAF=6007
        6003            SRQ=6003
        4432            DBDI=JMS I XDBDI
        4433            DBEI=JMS I XDBEI
        4434            DBSK=JMS I XDBSK
        4435            DBCI=JMS I XDBCI
        4436            DBRI=JMS I XDBRI
        4437            DBCO=JMS I XDBCO
        4440            DBSO=JMS I XDBSO
        4441            DBRO=JMS I XDBRO
                        /
                        /LOCATION EQUIVALENCIES
                        /
        3026            MSTDGT=ERADR+1
        3027            LSTDGT=ERADR+2
```



```
                        /
                        /GENERAL VARIABLES
                        /
        0010    *10
  0010  0000    POINT1, 0
        0020    *20
  0020  0000    CNTR1,  0
  0021  0000    DATA1,  0
  0022  0000    DATA2,  0
  0023  0000    DATA3,  0
  0024  0000    DATA4,  0
  002"  0000    DATA5,  0
  00:   7777    IJUMPE, 7777            /IN  /RUPT JUMPER    K

  0027  7777    FJUMPE, 7777            /FLIPFLOP JUMPER MASK
```

```
0030  0000    TYPFLG, 0
0031  0000    LPCNT,  0

                /
                /INDIRECT POINTERS
                /
0032  0261    XDBDI,  DBDIX
0033  0266    XDBEI,  DBEIX
0034  0273    XDBSK,  DBSKX
0035  0300    XDBCI,  DBCIX
0036  0305    XDBRI,  DBRIX
0037  0312    XDBCO,  DBCOX
0040  0317    XDBSO,  DBSOX
0041  0324    XDBRO,  DBROX
0042  3200    XPRINT, PRINT
0043  3251    XTYPE,  TYPE
0044  2600    XERROR, ERROR
0045  2667    XLOOP1, LOOP1
0046  2712    XLOOP2, LOOP2

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                /
                /TEST INITIALIZATION
                /
      0200    *200
0200  5202            JMP     START1
0201  5244            JMP     START2
0202  6007    START1, CAF                     /CLEAR ALL FLAGS
0203  4442            JMS I   XPRINT          /TYPE "SET SR FOR DEVICE
0204  3377            M1-1                    /CODE AND CONT"
0205  7402            HLT                     /HALT FOR SWITCHES
0206  7604            LAS                     /GET SWITCHES
0207  0377            AND     (7              /MASK DEVICE CODE
0210  7106            CLL RTL                 /POSITION BITS
0211  7004            RAL
0212  1376            TAD     (6500           /GENERATE BASIC IOT
0213  3247            DCA     IOTS            /SAVE BASIC IOT
0214  4442            JMS I   XPRINT          /TYPE "SET SR FOR JUMPERS
0215  3420            M2-1                    /AND CONT"
0216  7402            HLT                     /HALT FOR SWITCHES
0217  7604            LAS                     /GET SWITCHES
0220  3026            DCA     IJUMPER         /SAVE JUMPER MASK
0221  4442            JMS I   XPRINT
0222  3444            M2A-1
0223  7402            HLT
0224  7604            LAS
0225  3027            DCA     FJUMPER
0226  1375            TAD     (-10            /8 IOTS WILL BE
0227  3020            DCA     CNTR1           /SET UP
0230  1260            TAD     DIOT            /STORE INSTRUCTION FOR
0231  3233            DCA     PNTR1           /IOT SET UP
0232  1247            TAD     IOTS            /GET IOT
0233  0000    PNTR1,  0                       /STORE IT
0234  2233            ISZ     PNTR1           /PREPARE TO STORE
0235  2247            ISZ     IOTS            /NEXT IOT
0236  2020            ISZ     CNTR1
0237  5232            JMP     PNTR1-1
0240  4442            JMS I   XPRINT          /TYPE "SET SR FOR RUN
0241  3475            M3-1                    /AND CONT
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0242  7402            HLT                     /HALT FOR SWITCHES
0243  7300            CLA CLL
0244  3030    START2, DCA     TYPFLG          /CLEAR ERROR FLAG           /CLEAR TYPE FLAG
0245  5646            JMP I   .+1             /GO TO FIRST TEST
0246  0400            INIT1

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                        /
                        /INITIALIZATION CONSTANTS AND VARIABLES
                        /
0247  0000    IOTS,   0                       /BASIC IOT
0250  0262    TIOT,   DBDIX+1
0251  0267            DBEIX+1
0252  0274            DBSKX+1
0253  0301            DBCIX+1
0254  0306            DBRIX+1
0255  0313            DBCOX+1
0256  0320            DBSOX+1
0257  0325            DBROX+1
0260  3650    DIOT,   DCA I   TIOT
                        /
                        /IOT SUBROUTINES
                        /
                        /DISABLE DATA BUFFER INTERRUPT (DBDI,65X0)
                        /
0261  0000    DBDIX,  0
0262  6500            6500

0263  7410            SKP                     /TRAP FOR UNDESIRED
0264  7402            HLT                     /SKIPS
0265  5661            JMP I   DBDIX
                        /
                        /ENABLE DATA BUFFER INTERRUPTS (DBEI,65X1)
                        /
0266  0000    DBEIX,  0
0267  6501            6501

0270  7410            SKP                     /TRAP FOR UNDESIRED
0271  7402            HLT                     /SKIPS
0272  5666            JMP I   DBEIX
                        /
                        /SKIP ON DATA BUFFER INPUT FLAG (DBSK,65X2)
0273  0000    DBSKX,  0
0274  6502            6502

0275  7410            SKP
0276  2273            ISZ     DBSKX
0277  5673            JMP I   DBSKX
                        /
                        /0S TO INPUT REGISTER CORRESPONDING
                        /TO 1S IN AC (DBCI,65X3)
                        /
0300  0000    DBCIX,  0
0301  6503            6503

0302  7410            SKP                     /TRAP FOR UNDESIRED
03    7402            HLT                     /SKIPS
03    5700            JMP I   DBCIX
```

```
                        /
                        /INPUT REGISTER TO AC (DBRI,65X4)
                        /
0305  0000    DBRIX,    0
0306  6504              6504

0307  7410              SKP                     /TRAP FOR UNDESIRED
0310  7402              HLT                     /SKIPS
0311  5705              JMP I   DBRIX

                        /
                        /ZEROS TO OUTPUT REGISTER CORRESPONDING TO
                        /ONES IN AC (DBCO,65X5)
0312  0000    DBCOX,    0
0313  6505              6505

0314  7410              SKP                     /TRAP FOR UNDESIRED
0315  7402              HLT                     /SKIPS
0316  5712              JMP I   DBCOX
                        /
                        /1S TO OUTPUT REGISTER CORRESPONDING
                        /TO 1S IN AC (DBSO,65X6)
                        /
0317  0000    DBSOX,    0
0320  6506              6506

0321  7410              SKP                     /TRAP FOR UNDESIRED
0322  7402              HLT                     /SKIPS
0323  5717              JMP I   DBSOX
                        /
                        /JAM TRANSFER OUTPUT REGISTER TO AC (DBRO 65X7)
                        /
0324  0000    DBROX,    0
0325  6507              6507

0326  7410              SKP                     /TRAP FOR UNDESIRED
0327  7402              HLT                     /SKIPS
0330  5724              JMP I   DBROX
0375  7770
0376  6500
0377  0007
      0400    PAGE
```



```
                        /
                        /IS OUTPUT REGISTER CLEARED BY INITIALIZE?
                        /
0400  3030    INIT1,    DCA     TYPFLG          /CLEAR ERROR FLAG
0401  3031              DCA     LPCNT           /SET ITERATION COUNT TO 40.0 (DECIMAL)
0402  6007              CAF                     /INITIALIZE INTERFACE
0403  4441              DBRO                    /READ OUTPUT REGISTER
0404  3021              DCA     DATA1           /SAVE REGISTER DATA
0405  1021              TAD     DATA1           /GET REGISTER DATA
0406  7650              SNA CLA                 /WAS REGISTER CLEARED BY INITIALIZE
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0407  5214            JMP     .+5             /DATA CORRECT, CONTINUE
0410  4444            JMS I   XERROR          /NO, ERROR
0411  3645            INIT1E-1                /"OUTPUT REGISTER NOT CLEARED"
0412  3515            DH1-1                   /"REGISTER DATA"
0413  7777            -1                      /NUMBER OF WORDS TO BE OUTPUT
0414  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
0415  5202            JMP     INIT1+2         /LOOP ON CURRENT TEST
                      /
                      /IS INPUT REGISTER CLEARED BY INITIALIZE?
                      /
0416  3030    INIT2,  DCA     TYPFLG          /CLEAR ERROR FLAG
0417  3031            DCA     LPCNT           /SET ITERATION COUNT TO 4096(DECIMAL)
0420  7410            SKP
0421  6007            CAF                     /INITIALIZE INTERFACE
0422  4436            DBRI                    /READ INPUT REGISTER
0423  3021            DCA     DATA1           /SAVE REGISTER DATA
0424  1021            TAD     DATA1           /GET REGISTER DATA
0425  7650            SNA CLA                 /WAS REGISTER CLEARED
0426  5233            JMP     .+5             /DATA CORRECT, CONTINUE
0427  4444            JMS I   XERROR          /NO, ERROR
0430  3661            INIT2E-1                /"INPUT REGISTER NOT CLEARED"
0431  3515            DH1-1                   /"REGISTER DATA"
0432  7777            -1                      /NUMBER OF WORDS TO BE OUTPUT
0433  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
0434  5221            JMP     INIT2+3         /LOOP ON CURRENT TEST
                      /
                      /IS SKIP FLAG SET AFTER INITIALIZE
                      /
0435  3030    INIT3,  DCA     TYPFLG          /CLEAR ERROR FLAG
0436  3031            DCA     LPCNT           /SET ITERATION COUNT TO 4096(DECIMAL)
0437  7410            SKP
0440  6007            CAF                     /INITIALIZE INTERFACE
0441  4433            DBEI                    /ENABLE INTERFACE INTERRUPTS
0442  6003            SRQ                     /TEST FOR INTERRUPT ACTIVE
0443  5250            JMP     .+5             /NO INTERRUPT, CONTINUE
0444  4444            JMS I   XERROR          /INTERRUPT ACTIVE, ERROR
0445  4042            INT1E-1                 /"INTERRUPT ACTIVE"
0446  3514            DH0-1                   /NO DATA HEADER
0447  0000            0                       /NO DATA
0450  4434            DBSK                    /IS INTERFACE FLAG SET
0451  5256            JMP     .+5             /FLAG NOT SET, CONTINUE
0452  4444            JMS I   XERROR          /FLAG SET, ERROR
0453  3674            INIT3E-1                /"SKIP FLAG SET"
0454  3514            DH0-1                   /NO DATA HEADER

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0455  0000            0                       /NO DATA
0456  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
0457  5240            JMP     INIT3+3         /LOOP ON CURRENT TEST

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                      /
                      /DOES OUTPUT REGISTER JAM TRANSFER TO AC?
                      /
0460  3030    TRAN1,  DCA     TYPFLG          /CLEAR ERROR FLAG
0461  3031            DCA     LPCNT           /SET ITERATION COUNT TO 4096(DECIMAL)
0462  6007            CAF                     /INITIALIZE INTERFACE
0463  7340            CLA CLL CMA             /SET AC = 7
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 0464  4441            DBRO                    /READ INPUT REGISTER
 0465  3021            DCA     DATA1           /SAVE AC CONTENTS
 0466  1021            TAD     DATA1           /GET AC CONTENTS
 0467  7650            SNA CLA                 /WAS AC CLEARED BY TRANSFER
 0470  5275            JMP     .+5             /DATA CORRECT, CONTINUE
 0471  4444            JMS I   XERROR          /NO, ERROR
 0472  3703            TRAN1E=1                /"DBRO DID NOT CLEAR AC"
 0473  3525            DH2=1                   /"AC CONTENTS"
 0474  7777            =1                      /NUMBER OF WORDS TO BE OUTPUT
 0475  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
 0476  5262            JMP     TRAN1+2         /LOOP ON CURRENT TEST
                       /
                       /DOES INPUT REGISTER JAM TRANSFER TO AC
                       /
 0477  3030  TRAN2,    DCA     TYPFLG          /CLEAR ERROR FLAG
 0500  3031            DCA     LPCNT           /SET ITERATION COUNT TO 4096(DECIMAL)
 0501  6007            CAF                     /INITIALIZE INTERFACE
 0502  7340            CLA CLL CMA             /SET AC =7777
 0503  4436            DBRI                    /READ INPUT REGISTER
 0504  3021            DCA     DATA1           /SAVE AC CONTENTS
 0505  1021            TAD     DATA1           /GET AC CONTENTS
 0506  7650            SNA CLA                 /WAS AC CLEARED BY TRANSFER
 0507  5314            JMP     .+5             /DATA CORRECT, CONTINUE
 0510  4444            JMS I   XERROR          /NO, ERROR
 0511  3716            TRAN2E=1                /"DBRI DID NOT CLEAR AC"
 0512  3525            DH2=1                   /"AC CONTENTS"
 0513  7777            =1                      /NUMBER OF WORDS TO BE OUTPUT
 0514  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
 0515  5301            JMP     TRAN2+2         /LOOP ON CURRENT TEST
                       /
                       /DOES TRANSFER TO OUTPUT REGISTER CHANGE AC (WITH AC=7777,DBSO)
                       /
 0516  3030  TRAN3,    DCA     TYPFLG          /CLEAR ERROR FLAG
 0517  3031            DCA     LPCNT           /SET ITERATION COUNT TO 4096(DECIMAL)
 0520  6007            CAF                     /INITIALIZE INTERFACE
 0521  7340            CLA CLL CMA             /SET AC =7777
 0522  4440            DBSO                    /BIT SET OUTPUT REGISTER
 0523  3021            DCA     DATA1           /SAVE AC CONTENTS
 0524  1021            TAD     DATA1           /GET AC CONTENTS
 0525  7040            CMA                     /COMPLIMENT DATA TO TEST FOR 7777
 0526  7650            SNA CLA                 /DID AC CHANGE
 0527  5334            JMP     .+5             /DATA CORRECT, CONTINUE
 0530  4444            JMS I   XERROR          /NO, ERROR
 0531  3731            TRAN3E=1                /"DBSO CHANGED AC"
 0532  3525            DH2=1                   /"AC CONTENTS"
 0533  7777            =1                      /NUMBER OF WORDS TO BE OUTPUT
 0534  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
 0535  5320            JMP     TRAN3+2         /LOOP ON CURRENT TEST

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                       /
                       /DOES TRANSFER TO OUTPUT REGISTER CHANGE AC (WITH AC=7777, DBCO)
                       /
 0536  3030  TRAN4,    DCA     TYPFLG          /CLEAR ERROR FLAG
 0537  3031            DCA     LPCNT           /SET ITERATION COUNT TO 40[illegible]ECIMAL)
 0540  6007            CAF                     /INITIALIZE INTERFACE
 0541  7340            CLA CLL CMA             /SET AC =7777
 0542  4437            DBCO                    /BIT CLEAR OUTPUT REGIS[illegible]
 0543  3021            DCA     DATA1           /SAVE AC CONTENTS
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0544  1021            TAD     DATA1           /GET AC CONTENTS
0545  7040            CMA                     /COMPLIMENT DATA TO TEST FOR 7777
0546  7650            SNA CLA                 /DID AC CHANGE
0547  5354            JMP     .+5             /DATA CORRECT, CONTINUE
0550  4444            JMS I   XERROR          /NO, ERROR
0551  3741            TRAN4E-1                /"DBCO CHANGED AC"
0552  3525            DH2-1                   /"AC CONTENTS"
0553  7777            -1                      /NUMBER OF WORDS TO BE OUTPUT
0554  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
0555  5340            JMP     TRAN4+2         /LOOP ON CURRENT TEST
                      /
                      /DOES TRANSFER TO INPUT REGISTER CHANGE AC (WITH AC=7777, DBCI)
                      /
0556  3030    TRAN5,  DCA     TYPFLG          /CLEAR ERROR FLAG
0557  3031            DCA     LPCNT           /SET ITERATION COUNT TO 4096(DECIMAL)
0560  6007            CAF                     /INITIALIZE INTERFACE
0561  7340            CLA CLL CMA             /SET AC =7777
0562  4435            DBCI                    /BIT CLEAR INPUT REGISTER
0563  3021            DCA     DATA1           /SAVE AC CONTENTS
0564  1021            TAD     DATA1           /GET AC CONTENTS
0565  7040            CMA                     /COMPLIMENT DATA TO TEST FOR 7777
0566  7650            SNA CLA                 /DID AC CHANGE
0567  5374            JMP     .+5             /DATA CORRECT, CONTINUE
0570  4444            JMS I   XERROR          /NO, ERROR
0571  3751            TRAN5E-1                /"DBCI CHANGED AC"
0572  3525            DH2-1                   /"AC CONTENTS"
0573  7777            -1                      /NUMBER OF WORDS TO BE OUTPUT
0574  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
0575  5360            JMP     TRAN5+2         /LOOP ON CURRENT TEST
0576  5777            JMP     TRAN6           /GO TO NEXT TEST
0577  0600
      0600    PAGE

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                      /
                      /DOES TRANSFER TO OUTPUT REGISTER CHANGE AC (WITH AC=0,DBSO)
                      /
0600  3030    TRAN6,  DCA     TYPFLG          /CLEAR ERROR FLAG
0601  3031            DCA     LPCNT           /SET ITERATION COUNT TO 4096 (DECIMAL)
0602  6007            CAF                     /INITIALIZE INTERFACE
0603  4440            DBSO                    /BIT SET OUTPUT REGISTER
0604  3021            DCA     DATA1           /SAVE AC CONTENTS
0605  1021            TAD     DATA1           /GET AC CONTENTS
0606  7650            SNA CLA                 /WAS AC CHANGED
0607  5214            JMP     .+5             /DATA CORRECT, CONTINUE
0610  4444            JMS I   XERROR          /AC CHANGED, ERROR
0611  3731            TRAN3E-1                /"DBSO CHANGED AC"
0612  3525            DH2-1                   /"AC CONTENTS"
0613  7777            -1                      /NUMBER OF WORDS TO BE OUTPUT
0614  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
0615  5202            JMP     TRAN6+2         /LOOP ON CURRENT TEST
                      /
                      /DOES TRANSFER TO OUTPUT REGISTER CHANGE AC (WITH AC=0,DBCO)
                      /
0616  3030    TRAN7,  DCA     TYPFLG          /CLEAR ERROR FLAG
0617  3031            DCA     LPCNT           /SET ITERATION COUNT TO 4096 (DECIMAL)
06    6007            CAF                     /INITIALI   INTERFACE
06    4437            DBCO                    /BIT CLEA   UTPUT REGISTER
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0622  3021            DCA     DATA1           /SAV   C CONTENTS
0623  1021            TAD     DATA1           /GE\   CONTENTS
0624  7650            SNA CLA                 /IS AC STILL 0
0625  5232            JMP     .+5             /DATA CORRECT, CONTINUE
0626  4444            JMS I   XERROR          /NO, ERROR
0627  3741            TRAN4E-1                /"DBCO CHANGED AC"
0630  3525            DH2-1                   /"AC CONTENTS"
0631  7777            -1                      /NUMBER OF WORDS TO BE OUTPUT
0632  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
0633  5220            JMP     TRAN7+2         /LOOP ON CURRENT TEST
                      /
                      /DOES TRANSFER TO INPUT REGISTER CHANGE AC (WITH AC=0, DBCI)
                      /
0634  3030  TRAN8,    DCA     TYPFLG          /CLEAR ERROR FLAG
0635  3031            DCA     LPCNT           /SET ITERATION COUNT TO 4096 (DECIMAL)
0636  6007            CAF                     /INITIALIZE INTERFACE
0637  4435            DBCI                    /BIT CLEAR INPUT REGISTER
0640  3021            DCA     DATA1           /SAVE AC CONTENTS
0641  1021            TAD     DATA1           /GET AC CONTENTS
0642  7650            SNA CLA                 /IS AC STILL 0
0643  5250            JMP     .+5             /DATA CORRECT, CONTINUE
0644  4444            JMS I   XERROR          /AC CHANGED, ERROR
0645  3751            TRAN5E-1                /"DBCI CHANGED AC"
0646  3525            DH2-1                   /"AC CONTENTS"
0647  7777            -1                      /NUMBER OF WORDS TO BE OUTPUTED
0650  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
0651  5236            JMP     TRAN8+2         /LOOP ON CURRENT TEST
0652  5777/           JMP     OUT1            /GO TO NEXT TEST
0777  1000
      1000  PAGE

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                      /
                      /CAN ALL BITS IN OUTPUT REGISTER BE SET (DBSO)
                      /DOES INITIALIZE CLEAR OUTPUT REGISTER
                      /
1000  3030  OUT1,     DCA     TYPFLG          /CLEAR ERROR FLAG
1001  3031            DCA     LPCNT           /SET ITERATION COUNT TO 4096(DECIMAL)
1002  6007            CAF                     /INITIALIZE INTERFACE
1003  7340            CLA CLL CMA             /SET AC =7777
1004  4440            DBSO                    /BIT SET OUTPUT REGISTER
1005  4441            DBRO                    /READ OUTPUT REGISTER
1006  3021            DCA     DATA1           /SAVE REGISTER DATA
1007  1021            TAD     DATA1           /GET REGISTER DATA
1010  7040            CMA                     /COMPLIMENT DATA TO TEST FOR 7777
1011  7650            SNA CLA                 /IS REGISTER=7777
1012  5217            JMP     .+5             /DATA CORRECT, CONTINUE
1013  4444            JMS I   XERROR          /NO, ERROR
1014  3761            OUT1E-1                 /"DBSO ERROR"
1015  3515            DH1-1                   /"REGISTER DATA"
1016  7777            -1                      /NUMBER OF WORDS TO BE OUTPUT
1017  6007            CAF                     /INITIALIZE INTERFACE
1020  4441            DBRO                    /READ OUTPUT REGISTER
1021  3021            DCA     DATA1           /SAVE REGISTER DATA
1022  1021            TAD     DATA1           /GET REGISTER DATA
1023  7650            SNA CLA                 /WAS REGISTER CLEARED
1024  5231            JMP     .+5             /DATA CORRECT, CONTINUE
1025  4444            JMS I   XERROR          /NO, ERROR
1026  3645            INIT1E-1                /"OUTPUT REG NOT CLEARED"
```

```
1027  3515            DH1=1                   /"REGISTER DATA"
1030  7777            -1                      /NUMBER OF WORDS TO BE OUTPUT
1031  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1032  5202            JMP     OUT1+2          /LOOP ON CURRENT TEST
                      /
                      /CAN ALL BITS OF OUTPUT REGISTER BE CLEARED (DBCO)
                      /
1033  3030    OUT2,   DCA     TYPFLG          /CLEAR ERROR FLAG
1034  3031            DCA     LPCNT           /SET ITERATION COUNT TO 4096(DECIMAL)
1035  7340            CLA CLL CMA             /SET AC =7777
1036  4440            DBSO                    /BIT SET OUTPUT REGISTER
1037  4437            DBCO                    /BIT CLEAR OUTPUT REGISTER
1040  7300            CLA CLL
1041  4441            DBRO                    /READ OUTPUT REGISTER
1042  3021            DCA     DATA1           /SAVE REGISTER DATA
1043  1021            TAD     DATA1           /GET REGISTER DATA
1044  7650            SNA CLA                 /WAS OUTPUT REGISTER CLEARED
1045  5252            JMP     .+5             /DATA CORRECT, CONTINUE
1046  4444            JMS I   XERROR          /NO, ERROR
1047  3645            INITIE-1                /"OUTPUT REGISTER NOT CLEARED"
1050  3515            DH1=1                   /"REGISTER DATA"
1051  7777            -1                      /NUMBER OF WORDS TO BE OUTPUT
1052  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1053  5235            JMP     OUT2+2          /LOOP ON CURRENT TEST

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                      /
                      /CAN EACH BIT OF OUTPUT REGISTER BE SET
                      /INDEPENDENTLY (DBSO)
                      /
1054  3030    OUT3,   DCA     TYPFLG          /CLEAR ERROR FLAG
1055  1177            TAD     E-02            /SET ITERATION COUNT
1056  3031            DCA     LPCNT           /TO 50(DECIMAL)
1057  3021            DCA     DATA1           /CLEAR TEST DATA
1060  6007    OUT3A,  CAF                     /INITIALIZE INTERFACE
1061  1021            TAD     DATA1           /GET TEST DATA
1062  4440            DBSO                    /BIT SET OUTPUT REGISTER
1063  7300            CLA CLL
1064  4441            DBRO                    /READ OUTPUT REGISTER
1065  3022            DCA     DATA2           /SAVE REGISTER DATA
1066  1021            TAD     DATA1           /GET TEST DATA
1067  7041            CIA
1070  1022            TAD     DATA2           /COMPARE TO REGISTER CONTENTS
1071  7650            SNA CLA                 /DO THEY COMPARE
1072  5277            JMP     .+5             /DATA CORRECT, CONTINUE
1073  4444            JMS I   XERROR          /NO, ERROR
1074  3761            OUT1E-1                 /"DBSO ERROR"
1075  3560            DH4=1                   /"EXPECTED RECEIVED"
1076  7776            -2                      /NUMBER OF WORDS TO BE OUTPUT
1077  4446            JMS I   XLOOP2          /TEST FOR LOOP ON SAME DATA,ESCAPE ON DATA ERROR
1100  5260            JMP     OUT3A           /LOOP WITH SAME DATA
1101  2021            ISZ     DATA1           /INCREMENT DATA PATTERN
1102  5260            JMP     OUT3A           /CONTINUE TEST
1103  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1104  5257            JMP     OUT3+3          /LOOP ON CURRENT TEST
                      /
                      /CAN EACH BIT OF OUTPUT REGISTER BE CLEARED
                      /INDEPENDENTLY (DBC   )
                      /
```

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1105  3030    OUT4,   DCA     TYPFLG          /CLEAR ERROR FLAG
1106  1177            TAD     C-62            /SET ITERATION COUNT
1107  3031            DCA     LPCNT           /TO 50(DECIMAL)
1110  3021            DCA     DATA1           /CLEAR TEST DATA
1111  6007    OUT4A,  CAF                     /INITIALIZE INTERFACE
1112  1021            TAD     DATA1           /GET MASK
1113  7040            CMA                     /COMPLIMENT TO GET EXPECTED RESULT
1114  3022            DCA     DATA2           /SAVE EXPECTED RESULT
1115  7040            CMA                     /SET OUTPUT REGISTER TO 7777
1116  4440            DBSO                    /BIT SET OUTPUT REGISTER
1117  7300            CLA CLL
1120  1021            TAD     DATA1           /GET PATTERN TO CLEAR OUTPUT REGISTER
1121  4437            DBCO                    /BIT CLEAR OUTPUT REGISTER
1122  4441            DBRO                    /READ OUTPUT REGISTER
1123  3023            DCA     DATA3           /SAVE REGISTER DATA
1124  1022            TAD     DATA2           /GET EXPECTED RESULT
1125  7041            CIA
1126  1023            TAD     DATA3           /COMPARE TO RECEIVED DATA
1127  7650            SNA CLA                 /WERE CORRECT BITS IN OUTPUT REGISTER CLEARED
1130  5335            JMP     .+5             /DATA CORRECT, CONTINUE
1131  4444            JMS I   XERROR          /NO, ERROR
1132  3767            OUT4E-1                 /"DBCO ERROR"

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1133  3534            DH3-1                   /MASK EXPECTED RECEIVED
1134  7775            -3                      /NUMBER OF WORDS TO BE OUTPUT
1135  4446            JMS I   XLOOP2          /TEST FOR LOOP ON SAME DATA,ESCAPE ON DATA ERROR
1136  5311            JMP     OUT4A           /LOOP WITH SAME DATA
1137  2021            ISE     DATA1           /INCREMENT DATA PATTERN
1140  5311            JMP     OUT4A           /CONTINUE TEST
1141  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1142  5310            JMP     OUT4+3          /LOOP ON CURRENT TEST
1143  5777/           JMP     OUT5
1177  1200
      1200    PAGE
                      /
                      /WITH OUTPUT REGISTER CLEARED, DOES CLEARING
                      /OUTPUT REGISTER CHANGE ANY BIT IN OUTPUT
                      /
1200  3030    OUT5,   DCA     TYPFLG          /CLEAR ERROR FLAG
1201  1177            TAD     C-62            /SET ITERATION COUNT
1202  3031            DCA     LPCNT           /TO 50 (DECIMAL)
1203  3021            DCA     DATA1           /CLEAR TEST DATA
1204  3022            DCA     DATA2           /CLEAR EXPECTED RESULT
1205  6007    OUT5A,  CAF                     /INITIALIZE INTERFACE
1206  1021            TAD     DATA1           /GET TEST DATA
1207  4437            DBCO                    /BIT CLEAR OUTPUT REGISTER
1210  7300            CLA CLL
1211  4441            DBRO                    /READ OUTPUT REGISTER
1212  3023            DCA     DATA3           /SAVE REGISTER DATA
1213  1023            TAD     DATA3           /GET REGISTER DATA
1214  7650            SNA CLA                 /IS OUTPUT REGISTER 0
1215  5222            JMP     .+5             /DATA CORRECT, CONTINUE
1216  4444            JMS I   XERROR          /NO, ERROR
1217  3767            OUT4E-1                 /"DBCO ERROR"
1220  3534            DH3-1                   /"MASK EXPECTED RECEIVED"
1221  7775            -3                      /NUMBER OF DATA WORDS
1222  4446            JMS I   XLOOP2          /TEST FOR LOOP ON SAME DA
1223  5205            JMP     OUT5A           /LOOP WITH SAME DATA
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1224  2021            ISZ     DATA1           /INCREMENT DATA PATTERN
1225  5205            JMP     OUT5A           /CONTINUE
1226  4445            JMS I   XLOOP1          /CHECH FOR LOOP ON CURRENT TEST
1227  5203            JMP     OUT5+3          /LOOP ON CURRENT TEST

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                        /
                        /DOES SETTING OUTPUT REGISTER TWICE WITH SAME
                        /DATA CHANGE OUTPUT REGISTER
                        /
1230  3030      OUT6,   DCA     TYPFLG          /CLEAR ERROR FLAG
1231  1177            TAD     C-62            /SET ITERATION COUNT
1232  3031            DCA     LPCNT           /TO 50 (DECIMAL)
1233  3021            DCA     DATA1           /CLEAR TEST DATA
1234  6007      OUT6A,  CAF                     /INITIALIZE INTERFACE
1235  1021            TAD     DATA1           /GET TEST DATA
1236  4440            DBSO                    /BIT SET OUTPUT REGISTER
1237  4440            DBSO                    /BIT SET OUTPUT REGISTER
1240  7300            CLA CLL
1241  4441            DBRO                    /READ OUTPUT REGISTER
1242  3022            DCA     DATA2           /SAVE REGISTER DATA
1243  1021            TAD     DATA1           /GET TEST DATA
1244  7041            CIA
1245  1022            TAD     DATA2           /COMPARE TO REGISTER DATA
1246  7650            SNA CLA                 /ARE THEY THE SAME
1247  5254            JMP     .+5             /DATA CORRECT, CONTINE
1250  4444            JMS I   XERROR          /NO, ERROR
1251  3767            OUT4E-1                 /"DBSO ERROR"
1252  3560            DH4-1                   /"EXPECTED RECEIVED"
1253  7776            -2                      /NUMBER OF DATA WORDS
1254  4446            JMS I   XLOOP2          /TEST FOR LOOP ON SAME DATA
1255  5234            JMP     OUT6A           /LOOP WITH SAME DATA
1256  2021            ISZ     DATA1           /INCREMENT DATA PATTERN
1257  5234            JMP     OUT6A           /CONTINUE
1260  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1261  5233            JMP     OUT6+3          /LOOP ON CURRENT TEST

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                        /
                        /DOES READING OUTPUT REGISTER TWICE CHANGE
                        /OUTPUT REGISTER
                        /
1262  3030      OUT7,   DCA     TYPFLG          /CLEAR ERROR FLAG
1263  1177            TAD     C-62            /SET ITERATION COUNT
1264  3031            DCA     LPCNT           /TO 50 (DECIMAL)
1265  3021            DCA     DATA1           /CLEAR TEET DATA
1266  6007      OUT7A,  CAF                     /INITIALIZE INTERFACE
1267  1021            TAD     DATA1           /GET TEST DATA
1270  4440            DBSO                    /BIT SET OUTPUT REGISTER
1271  7300            CLA CLL
1272  4441            DBRO                    /READ OUTPUT REGISTER
1273  7300            CLA CLL
1274  4441            DBRO                    /READ OUTPUT REGISTER
1275  3022            DCA     DATA2           /SAVE REGISTER DATA
1276  1021            TAD     DATA1           /GET TEST DATA
1277  7041            CIA
1300  1022            TAD     DATA2           /COMPARE    REGISTER DATA
1301  7650            SNA CLA                 /ARE THE    E SAME
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1302  5307            JMP     .+5             /DAT  ORRECT, CONTINUE
1303  4444            JMS I   XERROR          /NO,  ROR
1304  3775            OUT7E-1                 /"DBRD ERROR"
1305  3560            DH4-1                   /"EXPECTED RECEIVED"
1306  7776            -2                      /NUMBER OF DATA WORDS
1307  4446            JMS I   XLOOP2          /TEST FOR LOOP WITH SAME DATA
1310  5266            JMP     OUT7A           /LOOP WITH SAME DATA
1311  2021            ISZ     DATA1           /INCREMENT DATA PATTERN
1312  5266            JMP     OUT7A           /CONTINUE
1313  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1314  5265            JMP     OUT7+3          /LOOP ON CURRENT TEST

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                        /
                        /DOES CLEARING OUTPUT REGISTER TWICE
                        /CHANGE ANY BIT IN OUTPUT REGISTER
                        /
1315  3030      OUT8,   DCA     TYPFLG          /CLEAR ERROR FLAG
1316  1177              TAD     [-62            /SET ITERATION COUNT
1317  3031              DCA     LPCNT           /TO 50 (DECIMAL)
1320  3021              DCA     DATA1           /CLEAR TEST DATA
1321  3022              DCA     DATA2           /CLEAR EXPECTED RESULT
1322  6007      OUT8A,  CAF                     /INITIALIZE INTERFACE
1323  1021              TAD     DATA1           /GET TEST DATA
1324  4440              DBSO                    /BIT SET OUTPUT REGISTER
1325  4437              DBCO                    /BIT CLEAR OUTPUT REGISTER
1326  4437              DBCO                    /BIT CLEAR OUTPUT REGISTER
1327  7300              CLA CLL
1330  4441              DBRO                    /READ OUTPUT REGISTER
1331  3023              DCA     DATA3           /SAVE REGISTER DATA
1332  1023              TAD     DATA3           /GET REGISTER DATA
1333  7650              SNA CLA                 /IS REGISTER 0
1334  5341              JMP     .+5             /DATA CORRECT, CONTINUE
1335  4444              JMS I   XERROR          /NO, ERROR
1336  3767              OUT4E-1                 /"DBCO ERROR"
1337  3534              DH3-1                   /"MASK EXPECTED RECEIVED"
1340  7775              -3                      /NUMBER OF DATA WORDS
1341  4446              JMS I   XLOOP2          /TEST FOR LOOP WITH SAME DATA
1342  5322              JMP     OUT8A           /LOOP WITH SAME DATA
1343  2021              ISZ     DATA1           /INCREMENT DATA PATTERN
1344  5322              JMP     OUT8A           /CONTINUE
1345  4445              JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1346  5320              JMP     OUT8+3          /LOOP ON CURRENT TEST
1347  5777              JMP     IN1
1377  1400
      1400      PAGE

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                        /
                        /CAN ALL BITS IN INPUT REGISTER BE SET
                        /DOES INITIALIZE CLEAR INPUT REGISTER
                        /
1400  3030      IN1,    DCA     TYPFLG          /CLEAR ERROR FLAG
1401  3031              DCA     LPCNT           /SET ITERATION COUNT TO 4096(DECIMAL)
1402  6007              CAF                     /INITIALIZE INTERFACE
1403  7340      IN1A,   CLA CLL CMA             /SET AC =7777
1404  4440              DBSO                    /BIT SET OUTPUT REGISTER
1405  7300              CLA CLL
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1406  4436            DBRI                    /READ INPUT REGISTER
1407  3021            DCA     DATA1           /SAVE REGISTER DATA
1410  1021            TAD     DATA1           /GET REGISTER DATA
1411  7040            CMA             /COMPLIMENT TO TEST FOR 7777
1412  7650            SNA CLA                 /WAS INPUT REGISTER SET TO 7777
1413  5220            JMP     .+5             /DATA CORRECT, CONTINUE
1414  4444            JMS I   XERROR          /NO, ERROR
1415  4011            IN3E=1                  /"INPUT REGISTER NOT CORRECT"
1416  3515            DH1=1                   /"REGISTER DATA"
1417  7777            =1                      /NUMBER OF WORDS TO BE OUTPUT
1420  6007    IN1B,   CAF                     /INITIALIZE INTERFACE
1421  4436            DBRI                    /READ INPUT REGISTER
1422  3021            DCA     DATA1           /SAVE REGISTER DATA
1423  1021            TAD     DATA1
1424  7650            SNA CLA
1425  5232            JMP     .+5             /DATA CORRECT, CONTINUE
1426  4444            JMS I   XERROR          /NO, ERROR
1427  3661            INIT2E=1                /"INPUT REGISTER NOT CLEARED"
1430  3515            DH1=1                   /"REGISTER DATA"
1431  7777            =1                      /NUMBER OF WORDS TO BE OUTPUT
1432  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1433  5203            JMP     IN1A            /LOOP ON CURRENT TEST

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                        /
                        /CAN ALL BITS IN INPUT REGISTER BE CLEARED (DBCI)
                        /
1434  3030    IN2,    DCA     TYPFLG          /CLEAR ERROR FLAG
1435  3031            DCA     LPCNT           /SET ITERATION COUNT TO 4096(DECIMAL)
1436  6007            CAF                     /INITIALIZE INTERFACE
1437  7340            CLA CLL CMA             /SET AC =7777
1440  0027            AND     FJUMPER         /MASK TO TEST ONLY FLIPFLOP BITS
1441  3021            DCA     DATA1           /SAVE MASK
1442  1021            TAD     DATA1           /GET MASK
1443  7040            CMA                     /COMPLIMENT TO GET EXPECTED RESULT
1444  3022            DCA     DATA2           /SAVE EXPECTED RESULT
1445  1021            TAD     DATA1           /GET MASK
1446  4440            DBSO                    /BIT SET OUTPUT REGISTER
1447  4435            DBCI                    /BIT CLEAR INPUT REGISTER
1450  7300            CLA CLL
1451  4436            DBRI                    /READ INPUT REGISTER
1452  3023            DCA     DATA3           /SAVE REGISTER DATA
1453  1022            TAD     DATA2           /GET EXPECTED RESULT
1454  7041            CIA
1455  1023            TAD     DATA3           /COMPARE TO REGISTER DATA
1456  7650            SNA CLA                 /WERE CORRECT BITS CLEARED
1457  5264            JMP     .+5             /DATA CORRECT, CONTINUE
1460  4444            JMS I   XERROR          /NO, ERROR
1461  4003            IN2E=1                  /"DBCI ERROR"
1462  3534            DH3=1                   /"MASK EXPECTED RECEIVED"
1463  7775            =3                      /NUMBER OF WORDS TO BE OUTPUT
1464  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1465  5236            JMP     IN2+2           /LOOP ON CURRENT TEST

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                        /
                        /CAN EACH BIT OF INP ) REGISTER BE   ) INDEPENDENTLY
                        /
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1466  3030    IN3,    DCA     TYPFLG          /CLEAR ERROR FLAG
1467  1177            TAD     [-62            /SET ITERATION COUNT
1470  3031            DCA     LPCNT           /TO 50(DECIMAL)
1471  3021            DCA     DATA1           /CLEAR TEST DATA
1472  6007    IN3A,   CAF                     /INITIALIZE INTERFACE
1473  1021            TAD     DATA1           /GET TEST DATA
1474  4440            DBSO                    /BIT SET OUTPUT REGISTER
1475  7300            CLA CLL
1476  4436            DBRI                    /READ INPUT REGISTER
1477  3022            DCA     DATA2           /SAVE REGISTER DATA
1500  1021            TAD     DATA1           /GET TEST DATA
1501  7041            CIA
1502  1022            TAD     DATA2           /COMPARE TO RECEIVED DATA
1503  7650            SNA CLA                 /ARE THEY THE SAME
1504  5311            JMP     .+5             /DATA CORRECT, CONTINUE
1505  4444            JMS I   XERROR          /NO, ERROR
1506  4011            IN3E-1                  /"INPUT REGISTER DATA ERROR"
1507  3560            DH4-1                   /"EXPECTED RECEIVED"
1510  7776            -2                      /NUMBER OF WORDS TO BE OUTPUT
1511  4446            JMS I   XLOOP2          /TEST FOR LOOP ON SAME DATA,ESCAPE ON DATA ERROR
1512  5272            JMP     IN3A            /LOOP WITH SAME DATA
1513  2021            ISZ     DATA1           /INCREMENT DATA PATTERN
1514  5272            JMP     IN3A            /CONTINUE TEST
1515  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1516  5271            JMP     IN3+3           /LOOP ON CURRENT TEST
1517  5777            JMP     IN5
1577  1600
      1600    PAGE

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                        /
                        /VERIFY THAT ALL LATCHING INPUT LINES HOLD DATA
                        /

1600  3030    IN5,    DCA     TYPFLG          /CLEAR ERROR FLAG
1601  1177            TAD     [-62            /SET ITERATION COUNT
1602  3031            DCA     LPCNT           /TO 50(DECIMAL)
1603  3023            DCA     DATA3           /CLEAR TEST DATA
1604  6007    IN5A,   CAF                     /INITIALIZE INTERFACE
1605  1023            TAD     DATA3           /GET TEST DATA
1606  0027            AND     FJUMPER         /MASK OFF NON LATCHING BITS
1607  3021            DCA     DATA1           /SAVE AS EXPECTED RESULT
1610  1021            TAD     DATA1           /GET TEST DATA
1611  7450            SNA                     /ARE ANY BITS TO BE TESTED
1612  5233            JMP     IN5C            /NO, GET NEXT DATA WORD
1613  4440            DBSO                    /BIT SET OUTPUT REGISTER
1614  4437            DBCO                    /BIT CLEAR OUTPUT REGISTER
1615  7300            CLA CLL
1616  4436            DBRI                    /READ INPUT REGISTER
1617  3022            DCA     DATA2           /SAVE REGISTER DATA
1620  1021            TAD     DATA1           /GET EXPECTED RESULT
1621  7041            CIA
1622  1022            TAD     DATA2           /COMPARE TO RECEIVED DATA
1623  7650            SNA CLA                 /ARE THEY THE SAME
1624  5231            JMP     .+5             /DATA CORRECT, CONTINUE
1625  4444            JMS I   XERROR          /NO, ERROR
1626  4026            IN4E-1                  /"LATCH ERROR"
1627  3560            DH4-1                   /"EXPECTED RECEIVED"
1630  7776            -2                      /NUMBER OF WORDS TO BE OUTP
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1631  4446              JMS I   XLOOP2          /TEST F.R LOOP ON SAME DATA,ESCAPE ON DATA ERROR
1632  5204              JMP     IN5A            /LOOP WITH SAME DATA
1633  2023      IN5C,   ISZ     DATA3           /INCREMENT DATA PATTERN
1634  5204              JMP     IN5A            /CONTINUE TEST
1635  4445              JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1636  5203              JMP     IN5+3           /LOOP ON CURRENT TEST
```



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                        /
                        /VERIFY ALL NON LATCHING DATA BITS DO NOT HOLD DATA
                        /
1637  3030      IN6,    DCA     TYPFLG          /CLEAR ERROR FLAG
1640  1177              TAD     [-62            /SET ITERATION COUNT
1641  3031              DCA     LPCNT           /TO 50(DECIMAL)
1642  3024              DCA     DATA4           /CLEAR TEST DATA
1643  3022              DCA     DATA2           /CLEAR EXPECTED RESULT
1644  6007      IN6A,   CAF                     /INITIALIZE INTERFACE
1645  1027              TAD     FJUMPER         /GET MASK FOR NON LATCHING BITS
1646  7040              CMA                     /CHANGE TO MASK OFF LATCHING BITS
1647  0024              AND     DATA4
1650  3021              DCA     DATA1           /SAVE FOR TRANSMISSION
1651  1021              TAD     DATA1           /GET TEST DATA
1652  7450              SNA                     /ARE ANY BITS TO BE TESTED
1653  5272              JMP     IN6C            /NO GET NEXT DATA WORD
1654  4440              DBSO                    /BIT SET OUTPUT REGISTER
1655  4437              DBCO                    /BIT CLEAR OUTPUT REGISTER
1656  7300              CLA CLL
1657  4436              DBRI                    /READ INPUT REGISTER
1660  3023              DCA     DATA3           /SAVE REGISTER DATA
1661  1023              TAD     DATA3           /GET RECEIVED DATA
1662  7650              SNA CLA         /DID ANY BITS HOLD DATA
1663  5270              JMP     .+5             /DATA CORRECT, CONTINUE
1664  4444              JMS I   XERROR          /YES, ERROR
1665  4026              IN4E-1                  /"LATCH ERROR"
1666  3534              DH3-1                   /"MASK EXPECTED RECEIVED"
1667  7775              -3                      /NUMBER OF WORDS TO BE OUTPUT
1670  4446              JMS I   XLOOP2          /TEST FOR LOOP ON SAME DATA,ESCAPE ON DATA ERROR
1671  5244              JMP     IN6A            /LOOP WITH SAME DATA
1672  2024      IN6C,   ISZ     DATA4           /INCREMENT DATA PATTERN
1673  5244              JMP     IN6A            /CONTINUE TEST
1674  4445              JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1675  5242              JMP     IN6+3           /LOOP ON CURRENT TEST
```



```
                        /
                        /VERIFY THAT ALL LATCHING LINES CAN BE CLEARED INDEPENDENTLY
                        /
1676  3030      IN7,    DCA     TYPFLG          /CLEAR ERROR FLAG
1677  1177              TAD     [-62            /SET ITERATION COUNT
1700  3031              DCA     LPCNT           /TO 50(DECIMAL)
1701  3024              DCA     DATA4           /CLEAR TEST
1702  6007      IN7A,   CAF                     /INITIALIZE INTERFACE
1703  1027              TAD     FJUMPER         /GET MASK FOR LATCHING BITS
1704  0024              AND     DATA4           /MASK OFF NON LATCHING BITS
1705  3021              DCA     DATA1           /SAVE FOR TRANSMISSION
170   )021              TAD     DATA1           /GET TEST  A
170.  /040              CMA                     /COMPLIMEN  O GET
```

```
1710  3022            DCA     DATA2           /E)   TED RESULT
1711  7040            CMA                     /SE   UTPUT REGISTER=7777
1712  4440            DBSO                    /BIT SET OUTPUT REGISTER
1713  4437            DBCO                    /BIT CLEAR OUTPUT REGISTER
1714  7300            CLA CLL
1715  1021            TAD     DATA1           /GET TEST DATA
1716  4435            DBCI                    /BIT CLEAR INPUT REGISTER
1717  7300            CLA CLL
1720  4436            DBRI                    /READ INPUT REGISTER
1721  3023            DCA     DATA3           /SAVE REGISTER DATA
1722  1022            TAD     DATA2           /GET EXPECTED RESULT
1723  7041            CIA
1724  1023            TAD     DATA3           /COMPARE TO RECEIVED DATA
1725  7650            SNA CLA                 /ARE THEY THE SAME
1726  5333            JMP     .+5             /DATA CORRECT, CONTINUE
1727  4444            JMS I   XERROR          /NO, ERROR
1730  4026            IN4E-1                  /"LATCH ERROR"
1731  3534            DH3-1                   /"MASK EXPECTED RECEIVED"
1732  7775            -3                      /NUMBER OF WORDS TO BE OUTPUT
1733  4446            JMS I   XLOOP2          /TEST FOR LOOP ON SAME DATA,ESCAPE ON DATA ERROR
1734  5302            JMP     IN7A            /LOOP WITH SAME DATA
1735  2024  IN7C,     ISZ     DATA4           /INCREMENT DATA PATTERN
1736  5302            JMP     IN7A            /CONTINUE TEST
1737  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
1740  5301            JMP     IN7+3           /LOOP ON CURRENT TEST
1741  5777            JMP     IN8             /GO TO NEXT TEST
1777  2000
      2000    PAGE

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                        /
                        /WITH THE INPUT REGISTER CLEARED, DOES CLEARING
                        /THE INPUT REGISTER SET ANY BIT IN INPUT
                        /
2000  3030  IN8,       DCA     TYPFLG          /CLEAR ERROR FLAG
2001  1177            TAD     [-62            /SET ITERATION COUNT
2002  3031            DCA     LPCNT           /TO 50 (DECIMAL)
2003  3021            DCA     DATA1           /CLEAR TEST DATA
2004  3022            DCA     DATA2           /CLEAR EXPECTED RESULT
2005  6007  IN8A,     CAF                     /INITIALIZE INTERFACE
2006  1021            TAD     DATA1           /GET    TEST DATA
2007  4435            DBCI                    /BIT CLEAR INPUT REGISTER
2010  7300            CLA CLL
2011  4436            DBRI                    /READ INPUT REGISTER
2012  3023            DCA     DATA3           /SAVE REGISTER DATA
2013  1023            TAD     DATA3           /GET REGISTER DATA
2014  7650            SNA CLA                 /IS INPUT REGISTER 0
2015  5222            JMP     .+5             /DATA CORRECT, CONTINUE
2016  4444            JMS I   XERROR          /NO, ERROR
2017  4003            IN2E-1                  /"DBCI ERROR"
2020  3534            DH3-1                   /"MASK EXPECTED RECEIVED"
2021  7775            -3                      /NUMBER OF DATA WORDS
2022  4446            JMS I   XLOOP2          /TEST FOR LOOP WITH SAME DATA
2023  5205            JMP     IN8A            /LOOP WITH SAME DATA
2024  2021            ISZ     DATA1           /INCREMENT DATA PATTERN
2025  5205            JMP     IN8A            /CONTINUE
2026  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURREN  TEST
2027  5203            JMP     IN8+3           /LOOP ON CURRENT TEST
```

```
                        /
                        /DOES READING THE INPUT REGISTER TWICE
                        /CHANGE THE INPUT REGISTER
                        /
2030  3030    IN9,      DCA     TYPFLG          /CLEAR ERROR FLAG
2031  1177              TAD     C-62            /SET ITERATION COUNT
2032  3031              DCA     LPCNT           /TO 50 (DECIMAL)
2033  3021              DCA     DATA1           /CLEAR TEST DATA
2034  6007    IN9A,     CAF                     /INITIALIZE INTERFACE
2035  1021              TAD     DATA1           /GET TEST DATA
2036  4440              DBSO                    /BIT SET OUTPUT REGISTER
2037  7300              CLA CLL
2040  4436              DBRI                    /READ INPUT REGISTER
2041  7300              CLA CLL
2042  4436              DBRI                    /READ INPUT REGISTER
2043  3022              DCA     DATA2           /SAVE REGISTER DATA
2044  1021              TAD     DATA1           /GET TEST DATA
2045  7041              CIA
2046  1022              TAD     DATA2           /COMPARE TO REGISTER DATA
2047  7650              SNA CLA                 /ARE THEY THE SAME
2050  5255              JMP     .+5             /DATA CORRECT, CONTINUE
2051  4444              JMS I   XERROR          /NO, ERROR
2052  4034              IN9E-1                  /"DBRI ERROR"
2053  3560              DH4-1                   /"EXPECTED RECEIVED"
2054  7776              -2                      /NUMBER OF DAT WORDS
2055  4446              JMS I   XLOOP2          /TEST FOR LOOP WITH SAME DATA
2056  5234              JMP     IN9A            /LOOP WITH SAME DATA
2057  2021              ISZ     DATA1           /INCREMENT DATA PATTERN
2060  5234              JMP     IN9A            /CONTINUE
2061  4445              JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
2062  5233              JMP     IN9+3           /LOOP ON CURRENT TEST
```



```
                        /
                        /DOES CLEARING INPUT REGISTER TWICE SET ANY BIT
                        /IN INPUT REGISTER
                        /
2063  3030    IN10,     DCA     TYPFLG          /CLEAR ERROR FLAG
2064  1177              TAD     C-62            /SET ITERATION COUNT
2065  3031              DCA     LPCNT           /TO 50 (DECIMAL)
2066  3022              DCA     DATA2           /CLEAR EXPECTED RESULT
2067  3021              DCA     DATA1           /CLEAR TEST DATA
2070  6007    IN10A,    CAF                     /INITIALIZE INTERFACE
2071  1021              TAD     DATA1           /GET TEST DATA
2072  4440              DBSO                    /BIT SET OUTPUT REGISTER
2073  4437              DBCO                    /BIT CLEAR OUTPUT REGISTER
2074  4435              DBCI                    /BIT CLEAR INPUT REGISTER
2075  4435              DBCI                    /BIT CLEAR INPUT REGISTER
2076  7300              CLA CLL
2077  4436              DBRI                    /READ INPUT REGISTER
2100  3023              DCA     DATA3           /SAVE REGISTER DATA
2101  1023              TAD     DATA3           /GET REGISTER DATA
2102  7650              SNA CLA                 /IS INPUT REGISTER 0
2103  5310              JMP     .+5             /DATA CORRECT, CONTINUE
2104  4444              JMS I   XERROR          /NO, ERROR
2     4003              IN2E-1                  /"DBCI  R"
2.    3534              DH3-1                   /"MASK  CTED RECEIVED"
```

```
 2107  7775            -3                      /NUMBER OF DATA WORDS
 2110  4446            JMS I   XLOOP2          /TEST FOR LOOP WITH SAME DATA
 2111  5270            JMP     IN10A           /LOOP WITH SAME DATA
 2112  2021            ISZ     DATA1           /INCREMENT DATA PATTERN
 2113  5270            JMP     IN10A           /CONTINUE
 2114  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
 2115  5266            JMP     IN10+3          /LOOP ON CURRENT TEST
 2116  5777            JMP     INOU1           /GO TO NEXT TEST
 2177  2200
       2200    PAGE

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                        /
                        /WITH BOTH INPUT AND OUTPUT REGISTERS CLEARED
                        /DOES CLEARING OUTPUT SET
                        /ANY BIT IN INPUT
                        /
 2200  3030    INOUI,  DCA     TYPFLG          /CLEAR ERROR FLAG
 2201  1177            TAD     C-62            /SET ITERATION COUNT
 2202  3031            DCA     LPCNT           /TO 50 (DECIMAL)
 2203  3021            DCA     DATA1           /CLEAR TEST DATA
 2204  3022            DCA     DATA2           /CLEAR EXPECTED RESULT
 2205  6007    INOUIA, CAF                     /INITIALIZE INTERFACE
 2206  1021            TAD     DATAI           /GET TEST DATA
 2207  4437            DBCO                    /BIT CLEAR OUTPUT REGISTER
 2210  7300            CLA CLL
 2211  4436            DBRI                    /READ INPUT REGISTER
 2212  3023            DCA     DATA3           /SAVE REGISTER DATA
 2213  1023            TAD     DATA3           /GET REGISTER DATA
 2214  7650            SNA CLA                 /IS OUTPUT REGISTER 0
 2215  5222            JMP     .+5             /DATA CORRECT, CONTINUE
 2216  4444            JMS I   XERROR          /NO, ERROR
 2217  3767            OUT4E-I                 /"DBCO ERROR"
 2220  3534            DH3-1                   /"MASK EXPECTED RECEIVED"
 2221  7775            -3                      /NUMBER OF DATA WORDS
 2222  4446            JMS I   XLOOP2          /TEST FOR LOOP WITH SAME DATA
 2223  5205            JMP     INOU1A          /LOOP WITH SAME DATA
 2224  2021            ISZ     DATAI           /INCREMENT DATA PATTERN
 2225  5205            JMP     INOU1A          /CONTINUE
 2226  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
 2227  5203            JMP     INOU1+3         /LOOP ON CURRENT TEST

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                        /
                        /WITH BOTH INPUT AND OUTPUT REGISTERS CLEARED
                        /DOES CLEARING INPUT SET ANY BIT IN OUTPUT
                        /
 2230  3030    INOU2,  DCA     TYPFLG          /CLEAR ERROR FLAG
 2231  1177            TAD     C-62            /SET ITERATION COUNT
 2232  3031            DCA     LPCNT           /TO 50 (DECIMAL)
 2233  3021            DCA     DATA1           /CLEAR TEST DATA
 2234  3022            DCA     DATA2           /CLEAR EXPECTED RESULT
 2235  6007    INOU2A, CAF                     /INITIALIZE INTERFACE
 2236  1021            TAD     DATA1           /GET TEST DATA
 2237  4435            DBCI                    /BIT CLEAR INPUT REGISTER
 2240  7300            CLA CLL
 2241  4441            DBRO                    /READ OUTPUT REGISTER
 2242  3023            DCA     DATA3           /SAVE REGISTER DATA
```

```
2243  1023            TAD     DATA3           /GET REGISTER DATA
2244  7650            SNA CLA                 /IS OUTPUT REGISTER 0
2245  5252            JMP     .+5             /DATA CORRECT, CONTINUE
2246  4444            JMS I   XERROR          /NO, ERROR
2247  4003            IN2E-1                  /"DBCI ERROR"
2250  3534            DH3-1                   /"MASK EXPECTED RECEIVED"
2251  7775            -3                      /NUMBER OF DATAA WORDS
2252  4446            JMS I   XLOOP2          /TEST FOR LOOP WITH CURRENT DATA
2253  5235            JMP     INOU2A          /LOOP WITH SAME DATA
2254  2021            ISZ     DATA1           /INCREMENT DATA PATTERN
2255  5235            JMP     INOU2A          /CONTINUE
2256  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
2257  5233            JMP     INOU2+3         /LOOP ON CURRENT TEST
                      /
                      /WITH THE OUTPUT REGISTER SET TO ALL 1S, AND
                      /THE INPUT REGISTER CLEARED, DOES SELECTIVELY
                      /CLEARING THE OUTPUT REGISTER SET ANY BIT IN
                      /THE INPUT REGISTER
                      /
2260  3030    INOU3,  DCA     TYPFLG          /CLEAR ERROR FLAG
2261  1177            TAD     C-62            /SET ITERATION COUNT
2262  3031            DCA     LPCNT           /TO 50 (DECIMAL)
2263  3021            DCA     DATA1           /CLEAR TEST DATA
2264  3022            DCA     DATA2           /CLEAR EXPECTED RESULT
2265  6007    INOU3A, CAF                     /INITIALIZE INTERFACE
2266  7040            CMA                     /SET AC=7777
2267  4440            DBSO                    /BIT SET OUTPUT REGISTER
2270  4435            DBCI                    /BIT CLEAR INPUT REGISTER
2271  7300            CLA CLL
2272  1027            TAD     FJUMPER         /GET FLIPFLOP JUMPER MASK
2273  7040            CMA
2274  3022            DCA     DATA2
2275  1021            TAD     DATA1           /GET TEST DATA2
2276  7040            CMA                     /COMPLEMENT
2277  0022            AND     DATA2           /AND WITN COMPLEMENT OF JUMPER MASK
2300  3022            DCA     DATA2           /TO GET EXPECTED RESULT
2301  1021            TAD     DATA1           /GET TEST DATA
2302  4437            DBCO                    /BIT CLEAR OUTPUT REGISTER
2303  7300            CLA CLL
2304  4436            DBRI                    /READ INPUT REGISTER

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2305  3023            DCA     DATA3           /SAVE REGISTER DATA
2306  1023            TAD     DATA3           /GET REGISTER DATA
2307  7041            CIA
2310  1022            TAD     DATA2           /COMPARE TO EXPECTED RESULT
2311  7650            SNA CLA                 /ARE THEY THE SAME
2312  5317            JMP     .+5             /DATA CORRECT, CONTINUE
2313  4444            JMS I   XERROR          /NO, ERROR
2314  3767            OUT4E-1                 /"DBCO ERROR"
2315  3534            DH3-1                   /"MASK EXPECTED RECEIVED
2316  7775            -3                      /NUMBER OF DATA WORDS
2317  4446            JMS I   XLOOP2          /TEST FOR LOOP WITH SAME DATA
2320  5265            JMP     INOU3A          /LOOP WITH SAME DATA
2321  2021            ISZ     DATA1           /INCREMENT DATA PATTERN
2322  5265            JMP     INOU3A          /CONTINUE
2323  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
2324  5263            JMP     INOU3+3         /LOOP ON CURRENT TEST
                      /
```

```
                        /WITH THE INPUT REGISTER SET ALL IS, DOES SELECTIVE
                        /CLEARING THE OUTPUT REGISTER CLEAR ANY BITS IN THE IN
                        /REGISTER (EXCEPT THOSE NOT FLIPFLOPS)
                        /
2325  3030    INOU4,    DCA     TYPFLG          /CLEAR ERROR FLAG
2326  1177              TAD     C-62            /SET ITERATION COUNT
2327  3031              DCA     LPCNT           /TO 50 (DECIMAL)
2330  3021              DCA     DATA1           /CLEAR TEST DATA
2331  6007    INOU4A,   CAF                     /INITIALIZE INTERFACE
2332  7040              CMA                     /SET AC TO 7777
2333  4440              DBSO                    /BIT SET OUTPUT REGISTER
2334  7300              CLA CLL
2335  1027              TAD     FJUMPER         /GET FLIPFLOP JUMPER MASK
2336  7040              CMA
2337  0021              AND     DATA1           /COMBINE WITH MASK
2340  7040              CMA
2341  3022              DCA     DATA2           /TO GET EXPECTED RESULT
2342  1021              TAD     DATA1           /GET TEST DATA
2343  4437              DBCO                    /BIT CLEAR OUTPUT REGISTER
2344  7300              CLA CLL
2345  4436              DBRI                    /READ INPUT REGISTER
2346  3023              DCA     DATA3           /SAVE REGISTER DATA
2347  1022              TAD     DATA2           /GET EXPECTED RESULT
2350  7041              CIA
2351  1023              TAD     DATA3           /COMPARE TO RECEIVED DATA
2352  7650              SNA CLA                 /ARE THEY THE SAME
2353  5360              JMP     .+5             /DATA CORRECT, CONTINUE
2354  4444              JMS I   XERROR          /NO, ERROR
2355  3767              OUT4E-I                 /"DBCO ERROR"
2356  3534              DH3-I                   /"MASK EXPECTED RECEIVED"
2357  7775              -3                      /NUMBER OF DATA WORDS
2360  4446              JMS I   XLOOP2          /TEST FOR LOOP WITH CURRENT DATA
2361  5331              JMP     INOU4A          /LOOP WITH SAME DATA
2362  2021              ISZ     DATA1           /INCREMENT DATA PATTERN
2363  5331              JMP     INOU4A          /CONTINUE
2364  4445              JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
2365  5330              JMP     INOU4+3         /LOOP ON CURRENT TEST
2366  5777              JMP     INT1            /GO TO NEXT TEST
2377  2400

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      2400    PAGE


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                        /
                        /VERIFY THAT EACH BIT SET UP TO  SKIP DOES
                        /
2400  3030    INT1,     DCA     TYPFLG          /CLEAR ERROR FLAG
2401  1177              TAD     C-62            /SET ITERATION COUNT
2402  3031              DCA     LPCNT           /TO 50(DECIMAL)
2403  3022              DCA     DATA2
2404  6007    INT1A,    CAF                     /INITIALIZE INTERFACE
2405  1022              TAD     DATA2
2406  0026              AND     IJUMPER
2407  7450              SNA
2410  5241              JMP     INT1D
2411  3021              DCA     DATA1           /SAVE TEST DATA
```

```
2412  1021            TAD     DATA1
2413  4440            DBSO                    /BIT SET OUTPUT REGISTER
2414  7300            CLA CLL
2415  6003            SRQ                     /IS INTERRUPT ACTIVE
2416  5223            JMP     .+5             /NO, CONTINUE
2417  4444            JMS I   XERROR          /YES, ERROR
2420  4042            INT1E-I                 /INTERRUPT ACTIVE
2421  3515            DH1-1
2422  7777            -1                      /NUMBER OF DATA WORDS TO BE OUTPUT
2423  4433            DBEI                    /ENABLE INTERFACE
2424  6003            SRQ                     /IS INTERRUPT ACTIVE
2425  5231            JMP     INT1AE          /NO, ERROR
2426  4434            DBSK                    /IS FLAG SET
2427  5246            JMP     INT1BE          /NO, ERROR
2430  5237            JMP     INT1OK          /INTERRUPT ACTIVE, FLAG SET
2431  4434    INT1AE, DBSK                    /IS INTERFACE FLAG SET
2432  5253            JMP     INT1CE
2433  4444            JMS I   XERROR          /NO, ERROR
2434  4042            INT1E-I
2435  3515            DH1-1
2436  7777            -1                      /NUMBER OF WORDS TO BE OUTPUT
2437  4446    INT1OK, JMS I   XLOOP2          /TEST FOR LOOP ON SAME DATA, ESCAPE ON DATA ERROR
2440  5204            JMP     INT1A           /LOOP WITH SAME DATA
2441  2022    INT1D,  ISZ     DATA2           /INCREMENT DATA PATTERN
2442  5204            JMP     INT1A           /CONTINUE
2443  4445            JMS I   XLOOP1          /CHECK FOR LOOP ON CURRENT TEST
2444  5203            JMP     INT1+3          /LOOP ON CURRENT TEST
2445  5260            JMP     INT3            /GO TO NEXT TEST
2446  4444    INT1BE, JMS I   XERROR          /NO, ERROR
2447  4065            INT3E-I
2450  3515            DH1-1
2451  7777            -1                      /NUMBER OF WORDS TO BE OUTPUT
2452  5237            JMP     INT1OK
2453  4444    INT1CE, JMS I   XERROR          /NO, ERROR
2454  4077            INT4E-I
2455  3515            DH1-1
2456  7777            -1                      /NUMBER OF WORDS TO BE OUTPUT
2457  5237            JMP     INT1OK

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                        /
                        /VERIFY THAT EACH BIT NOT JUMPERD TO SKIP DOES NOT
                        /
2460  3030    INT3,   DCA     TYPFLG          /CLEAR ERROR FLAG
2461  1177            TAD     [-62            /SET ITERATION COUNT
2462  3031            DCA     LPCNT           /TO 50 (DECIMAL)
2463  3022            DCA     DATA2           /CLEAR TEST DATA
2464  6007    INT3A,  CAF                     /INITIALIZE INTERFACE
2465  1026            TAD     IJUMPER         /GET JUMPER MASK
2466  7040            CMA                     /COMPLIMENT FOR NO SKIP BITS
2467  0022            AND     DATA2           /GET BITS TO BE TESTED
2470  7450            SNA                     /ARE ANY BITS TO BE TESTED
2471  5306            JMP     INT3C           /NO, GET NEXT DATA PATTERN
2472  3021            DCA     DATA1           /SAVE FOR OUTPUT
2473  1021            TAD     DATA1           /GET TEST DATA
2474  4440            DBSO                    /BIT SET OUTPUT REGISTER
2475  7300            CLA CLL
247   4434            DBSK                    /IS FLAG
24    5304            JMP     .+5             /NO, CONT
```

```
2500  4444            JMS I   XERROR          /YES,  ROR
2501  3674            INIT3E=1                /"SKI  AG SET"
2502  3515            DH1=1                   /"REGISTER DATA"
2503  7777            -1
2504  4446            JMS I   XLOOP2
2505  5264            JMP     INT3A
2506  2022    INT3C,  ISZ     DATA2
2507  5264            JMP     INT3A
2510  4445            JMS I   XLOOP1
2511  5263            JMP     INT3+3
2512  5777            JMP     EPASS

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                        /
                        /ERROR HANDLER
                        /
2577  3257
      2600      PAGE
2600  0000    ERROR,  0
2601  7300            CLA CLL
2602  1600            TAD I   ERROR           /GET POINTER TO ERROR MESSAGE
2603  3234            DCA     MESG            /SAVE POINTER
2604  2200            ISZ     ERROR
2605  1600            TAD I   ERROR           /GET POINTER TO DATA HEADER
2606  3236            DCA     DHDER           /SAVE HEADER
2607  2200            ISZ     ERROR                   /NUMBER OF WORDS TO BE OUTPUT
2610  1600            TAD I   ERROR           /GET NUMBER OF DATA WORDS TO BE TYPED
2611  3264            DCA     DATCNT          /SAVE
2612  1200            TAD     ERROR           /GET ADDRESS OF TEST THAT FAILED
2613  1377            TAD     (-3
2614  3776            DCA     LSTDGT
2615  1776            TAD     LSTDGT
2616  3266            DCA     ERRAD
2617  7604            LAS
2620  0334            AND     SR01
2621  7640            SZA CLA
2622  5254            JMP     EHALT
2623  1030            TAD     TYPFLG
2624  7640            SZA CLA
2625  5241            JMP     DATOUT
2626  7040            CMA
2627  3030            DCA     TYPFLG          /CLEAR ERROR FLAG
2630  4775            JMS     OCTASC
2631  4442            JMS I   XPRINT
2632  3024            ERADR=.
2633  4442            JMS I   XPRINT
2634  0000    MESG,   0
2635  4442            JMS I   XPRINT
2636  0000    DHDER,  0
2637  4442            JMS I   XPRINT                  /NUMBER OF WORDS TO BE OUTPUT
2640  3512            CRLF=1
2641  1264    DATOUT, TAD     DATCNT
2642  7650            SNA CLA
2643  5254            JMP     EHALT
2644  1265            TAD     DATAP
2645  3010            DCA     POINT1
2646  1410    BITS,   TAD I   POINT1
2647  4774            JMS     BITOUT
2650  2264            ISZ     DATCNT
```

```
2651  5246            JMP     BITS
2652  4442            JMS I   XPRINT
2653  3512            CRLF-1
2654  7604    EHALT,  LAS
2655  0333            AND     SR00
2656  7640            SZA CLA
2657  5262            JMP     .+3
2660  1266            TAD     ERRAD
2661  7402            HLT

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2662  2200            ISZ     ERROR
2663  5600            JMP I   ERROR
2664  0000    DATCNT, 0
2665  0020    DATAP,  DATA1-1
2666  0000    ERRAD,  0
                      /
                      /TEST FOR LOOP ON CURRENT TEST
                      /
2667  0000    LOOP1,  0
2670  1030            TAD     TYPFLG
2671  7650            SNA CLA
2672  5277            JMP     LP1EXA
2673  7604            LAS
2674  0341            AND     SR06
2675  7640            SZA CLA
2676  5310            JMP     LP1EXX-1
2677  7604    LP1EXA, LAS
2700  0340            AND     SR05
2701  7640            SZA CLA
2702  5305            JMP     LP1EXT
2703  2031            ISZ     LPCNT
2704  5311            JMP     LP1EXX
2705  7604    LP1EXT, LAS
2706  0335            AND     SR02
2707  7650            SNA CLA
2710  2267            ISZ     LOOP1
2711  5667    LP1EXX, JMP I   LOOP1
                      /
                      /TEST FOR LOOP ON CURRENT DATA
                      /
2712  0000    LOOP2,  0
2713  1030            TAD     TYPFLG
2714  7650            SNA CLA
2715  5326            JMP     LP2EXT
2716  7604            LAS
2717  0341            AND     SR06
2720  7650            SNA CLA
2721  5326            JMP     .+5             /DATA CORRECT, CONTINUE
2722  1312            TAD     LOOP2
2723  1373            TAD     (5
2724  3312            DCA     LOOP2
2725  5712            JMP I   LOOP2
2726  7604    LP2EXT, LAS
2727  0336            AND     SR03
2730  7650            SNA CLA
2731  2312            ISZ     LOOP2
      5712            JMP I   LOOP2
      4000    SR00,   4000
```

```
2734  2000    SR01,   2000
2735  1000    SR02,   1000
2736  0400    SR03,   400
2737  0200    SR04,   200
2740  0100    SR05,   100
2741  0040    SR06,   40

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                        /
                        /OCTAL TO PACKED ASCII CONVERSION
2773  0005
2774  3031
2775  3000
2776  3027
2777  7775
      3000    PAGE    /
3000  0000    OCTASC, 0
3001  7300            CLA CLL
3002  1227            TAD     LSTDGT          /GET WORD TO BE CONVERTED
3003  7002            BSW                     /SWAP HALVES, SEPARATE DIGITS,
3004  4212            JMS     SPLIT           /CONVERT MOST SIGNIFICANT
3005  3226            DCA     MSTDGT          /DIGITS TO ASCII
3006  1227            TAD     LSTDGT          /CONVERT LEAST SIGNIFICANT
3007  4212            JMS     SPLIT           /DIGITS TO ASCII
3010  3227            DCA     LSTDGT
3011  5600            JMP I   OCTASC          /RETURN
3012  0000    SPLIT,  0
3013  0377            AND     (77
3014  7421            MQL
3015  7501            MQA
3016  7106            CLL RTL
3017  7004            RAL
3020  0376            AND     (707
3021  7501            MQA
3022  0376            AND     (707
3023  1375            TAD     (6060
3024  5612            JMP I   SPLIT
3025  3736    ERADR,  TEXT    /<<     /
3026  4040
3027  4040
3030  4000
                        /
                        /OUTPUT 12 BIT BINARY WORD
                        /
3031  0000    BITOUT, 0
3032  7421            MQL                     /SAVE DATA IN MQ
3033  1374            TAD     (-14            /SET UP TO OURPUT
3034  3020            DCA     CNTR1           /12 BITS
3035  7501    BIT01,  MQA                     /GET DATA
3036  7104            CLL RAL                 /GET MSB INTO LINK
3037  7421            MQL                     /SAVE REST OF WORD
3040  1373            TAD     ("1             /GET ASCII 1 INTO AC
3041  7420            SNL
3042  0372            AND     ("0             /IS BIT=1
3043  4443            JMS I   XTYPE           /NO, CHANGE TO ASCII 0
3044  2020            ISZ     CNTR1           /OUTPUT BIT
3045  5235            JMP     BIT01           /CONTINUE
3046  1371            TAD     (240            /TYPE 2 SPACES
```

```
3047  4443            JMS I   XTYPE           /AFTER LAST BIT HAS BEEN
3050  1371            TAD     (240            /OUTPUTTED
3051  4443            JMS I   XTYPE
3052  5631            JMP I   BITOUT          /RETURN

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                        /
                        /CHARACTER STRING OUTPUT ROUTINE
3171  0240
3172  0260
3173  0261
3174  7764
3175  6060
3176  0707
3177  0077
      3200      PAGE    /
3200  0000      PRINT,  0
3201  7300              CLA CLL
3202  1600              TAD I   PRINT           /GET POINTER TO MESSAGE
3203  3010              DCA     POINT1          /SET UP AUTO-INDEX REGISTER
3204  2200              ISZ     PRINT           /SET UP RETURN
3205  1410              TAD I   POINT1          /GET PACKED WORD
3206  7421              MQL                     /SAVE IN MQ
3207  7501              MQA                     /GET WORD
3210  7002              BSW                     /SWAP HALVES
3211  4215              JMS     TYPSET          /DECODE AND OUTPUT
3212  7501              MQA                     /GET WORD
3213  4215              JMS     TYPSET          /DECODE AND OUTPUT
3214  5205              JMP     PRINT+5         /CONTINUE
                        /
                        /UNPACK, DECODE, OUTPUT
                        /
3215  0000      TYPSET, 0
3216  0243              AND     K0077           /MASK UNWANTED BITS
3217  7450              SNA                     /IS AC=0
3220  5600              JMP I   PRINT           /YES, END OF MESSAGE, EXIT
3221  1244              TAD     M40             /SUBTRACT 40
3222  7510              SPA                     /IS PACKED CHARACTER >40
3223  5226              JMP     .+3             /NO
3224  1250              TAD     K240            /YES, CONVERT TO ASCII
3225  5241              JMP     MTP             /OUTPUT
3226  7001              IAC                     /ADD 1 TO AC
3227  7440              SZA                     /IS CHARACTER=37
3230  5233              JMP     .+3             /NO,
3231  1245              TAD     K215            /GET CODE FOR CARRIAGE RETURN
3232  5241              JMP     MTP             /OUTPUT
3233  7001              IAC                     /ADD 1 TO AC
3234  7440              SZA                     /IS CHARACTER=37
3235  5240              JMP     .+3             /NO
3236  1246              TAD     K212            /GET CODE FOR LINE FEED
3237  5241              JMP     MTP             /OUTPUT
3240  1247              TAD     K336            /PACKED CHARACTER >40, CONVERT TO ASCII
3241  4443      MTP,    JMS I   XTYPE           /OUTPUT
3242  5615              JMP I   TYPSET
3243  0077      K0077,  77
3244  7740      M40,    -40
3   0215      K215,   215
3   0212      K212,   212
```

```
3247  0336    K336,   336
3250  0240    K240,   240

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                        /
                        /OUTPUT ONE CHARACTER TO TTY
                        /
3251  0000    TYPE,   0
3252  6046            TLS
3253  6041            TSF
3254  5253            JMP     .-1
3255  7200            CLA
3256  5651            JMP I   TYPE
                        /
                        /
                        /
3257  7604    EPASS,  LAS
3260  0777            AND     SR04
3261  7640            SZA CLA
3262  5776            JMP     INIT1
3263  7604            LAS
3264  0775            AND     SR05
3265  7640            SZA CLA
3266  5272            JMP     EPAS1
3267  4442            JMS I   XPRINT
3270  3274            MEP-1
3271  5776            JMP     INIT1
3272  1374    EPAS1,  TAD     (207
3273  4251            JMS     TYPE
3274  5776            JMP     INIT1
3275  3736    MEP,    TEXT    /--DR/
3276  0422
3277  0000

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                        /
                        /TELETYPE MESSAGES
                        /
3374  0207
3375  2740
3376  0400
3377  2737
      3400      PAGE
3400  3736    M1,     TEXT    /--SET SR FOR DEVICE CODE AND CONT/
3401  2305
3402  2440
3403  2322
3404  4006
3405  1722
3406  4004
3407  0526
3410  1103
3411  0540
3412  0317
3413  0405
3414  4001
3415  1604
```

```
3416  4003
3417  1716
3420  2400
3421  3736    M2,     TEXT    /**SET SR FOR INTERRUPT JUMPERS AND CONT/
3422  2305
3423  2440
3424  2322
3425  4006
3426  1722
3427  4011
3430  1624
3431  0522
3432  2225
3433  2024
3434  4012
3435  2515
3436  2005
3437  2223
3440  4001
3441  1604
3442  4003
3443  1716
3444  2400
3445  3736    M2A,    TEXT    /**SET SWITCHES FOR FLIPFLOP JUMPERS AND CONTINUE/
3446  2305
3447  2440
3450  2327
3451  1124
3452  0310
3453  0523
3454  4006
3455  1722

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3456  4006
3457  1411
3460  2006
3461  1417
3462  2040
3463  1225
3464  1520
3465  0522
3466  2340
3467  0116
3470  0440
3471  0317
3472  1624
3473  1116
3474  2505
3475  0000
3476  3736    M3,     TEXT    /**SET SR FOR RUN AND CONT/
3477  2305
3500  2440
3501  2322
3502  4006
3503  1722
3504  4022
      2516
      4001
```

```
3507  1604
3510  4003
3511  1716
3512  2400
3513  3736     CRLF,   TEXT    /←←/
3514  0000
                       /
                       /DATA HEADERS
                       /
3515  0000     DH0,    0
3516  3736     DH1,    TEXT    /←←REGISTER DATA/
3517  2205
3520  0711
3521  2324
3522  0522
3523  4004
3524  0124
3525  0100
3526  3736     DH2,    TEXT    /←←AC CONTENTS/
3527  0103
3530  4003
3531  1716
3532  2405
3533  1624
3534  2300
3535  3736     DH3,    TEXT    /←←MASK          EXPECTED      RECEIVED/
3536  1501
3537  2313
3540  4040
3541  4040

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3542  4040
3543  4040
3544  4040
3545  0530
3546  2005
3547  0324
3550  0504
3551  4040
3552  4040
3553  4040
3554  2205
3555  0305
3556  1126
3557  0504
3560  0000
3561  3736     DH4,    TEXT    /←←EXPECTED      RECEIVED/
3562  0530
3563  2005
3564  0324
3565  0504
3566  4040
3567  4040
3570  4040
3571  2205
3572  0305
3573  1126
3574  0504
```

```
3575  0000
3576  3736     DH5,     TEXT    /**REGISTER       DATA OUT       DATA IN/
3577  2205
3600  0711
3601  2324
3602  0522
3603  4040
3604  4040
3605  4040
3606  4004
3607  0124
3610  0140
3611  1725
3612  2440
3613  4040
3614  4040
3615  4040
3616  0401
3617  2401
3620  4011
3621  1600
3622  3736     DH6,     TEXT    /**AC CONTENTS    DATA OUT       DATA IN/
3623  0103
3624  4003
3625  1716
3626  2405
3627  1624
3630  2340

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3631  4040
3632  4004
3633  0124
3634  0140
3635  1725
3636  2440
3637  4040
3640  4040
3641  4040
3642  0401
3643  2401
3644  4011
3645  1600
                       /
                       /ERROR MESSAGE
                       /
3646  1725     INITIE,  TEXT    /OUTPUT REG NOT CLEARED/
3647  2420
3650  2524
3651  4022
3652  0507
3653  4016
3654  1724
3655  4003
3656  1405
3657  0122
3660  0504
3     0000
3.    1116     INIT2E,  TEXT    /INPUT REG NOT CLEARED/
```

```
3663  2025
3664  2440
3665  2205
3666  0740
3667  1617
3670  2440
3671  0314
3672  0501
3673  2205
3674  0400
3675  2313     INIT3E, TEXT    /SKIP FLAG SET/
3676  1120
3677  4006
3700  1401
3701  0740
3702  2305
3703  2400
3704  0402     TRAN1E, TEXT    /DBRO DID NOT CLEAR AC/
3705  2217
3706  4004
3707  1104
3710  4016
3711  1724
3712  4003
3713  1405
3714  0122

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3715  4001
3716  0300
3717  0402     TRAN2E, TEXT    /DBRI DID NOT CLEAR AC/
3720  2211
3721  4004
3722  1104
3723  4016
3724  1724
3725  4003
3726  1405
3727  0122
3730  4001
3731  0300
3732  0402     TRAN3E, TEXT    /DBSO CHANGED AC/
3733  2317
3734  4003
3735  1001
3736  1607
3737  0504
3740  4001
3741  0300
3742  0402     TRAN4E, TEXT    /DBCO CHANGED AC/
3743  0317
3744  4003
3745  1001
3746  1607
3747  0504
3750  4001
3751  0300
3752  0402     TRAN5E, TEXT    /DBCI CHANGED AC/
3753  0311
```

```
 3754  4003
 3755  1001
 3756  1607
 3757  0504
 3760  4001
 3761  0300
 3762  0402    OUT1E,  TEXT    /DBSO ERROR/
 3763  2317
 3764  4005
 3765  2222
 3766  1722
 3767  0000
 3770  0402    OUT4E,  TEXT    /DBCO ERROR/
 3771  0317
 3772  4005
 3773  2222
 3774  1722
 3775  0000
 3776  0402    OUT7E,  TEXT    /DBRO ERROR/
 3777  2217
 4000  4005
 4001  2222
 4002  1722
 4003  0000

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 4004  0402    IN2E,   TEXT    /DBCI ERROR/
 4005  0311
 4006  4005
 4007  2222
 4010  1722
 4011  0000
 4012  1116    IN3E,   TEXT    /INPUT REGISTER DATA ERROR/
 4013  2025
 4014  2440
 4015  2205
 4016  0711
 4017  2324
 4020  0522
 4021  4004
 4022  0124
 4023  0140
 4024  0522
 4025  2217
 4026  2200
 4027  1401    IN4E,   TEXT    /LATCH ERROR/
 4030  2403
 4031  1040
 4032  0522
 4033  2217
 4034  2200
 4035  0402    IN9E,   TEXT    /DBRI ERROR/
 4036  2211
 4037  4005
 4040  2222
 4041  1722
 4042  0000
 4043  1116    INT1E,  TEXT    /INTERRUPT ACTIVE/
 4044  2405
```

```
4045  2222
4046  2520
4047  2440
4050  0103
4051  2411
4052  2605
4053  0000
4054  1617    INT2E,  TEXT    /NO INTERRUPT, SKIP/
4055  4011
4056  1624
4057  0522
4060  2225
4061  2024
4062  5440
4063  2313
4064  1120
4065  0000
4066  1116    INT3E,  TEXT    /INTERRUPT, NO SKIP/
4067  2405
4070  2222
4071  2520
4072  2454

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4073  4016
4074  1740
4075  2313
4076  1120
4077  0000
4100  1617    INT4E,  TEXT    /NO INTERRUPT, NO SKIP/
4101  4011
4102  1624
4103  0522
4104  2225
4105  2024
4106  5440
4107  1617
4110  4023
4111  1311
4112  2000
4113  1617    INT5E,  TEXT    /NO SKIP/
4114  4023
4115  1311
4116  2000
4117  2313    INT6E,  TEXT    /SKIP/
4120  1120
4121  0000

              $
0177  7716

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0000  00000000  10000000  11111111  11111111  11111110  00000000  00000000  00000000
0100  00000000  00000000  00000000  00000000  00000000  00000000  00000000  20000001
```

```
02200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
02300  11111111  11111111  11111111  10000000  00000000  00000000  00000000  00000111

02400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
02500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

02600  11111111  11111111  11111111  11111111  11111111  11100000  00000000  00000000
02700  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000001


10000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
11000  11111111  11111111  11111111  11111111  11110000  00000000  00000000  00000001

12000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
13000  11111111  11111111  11111111  11111111  11111111  00000000  00000000  00000001

14000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
15000  11111111  11111111  00000000  00000000  00000000  00000000  00000000  00000001

16000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
17000  11111111  11111111  11111111  11111111  11000000  00000000  00000000  00000001


20000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
21000  11111111  11111110  00000000  00000000  00000000  00000000  00000000  00000001

22000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
23000  11111111  11111111  11111111  11111111  11111111  11111111  11111110  00000001

24000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
25000  11111111  11100000  00000000  00000000  00000000  00000000  00000000  00000001

26000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
27000  11111111  11111111  11111111  11111111  11000000  00000000  00000000  00000111


30000  11111111  11111111  11111111  11111111  11111111  11100000  00000000  00000000
31000  00000000  00000000  00000000  00000000  00000000  00000000  00000000  11111111

32000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
33000  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00011111

34000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
35000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

36000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
37000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
```



```
40000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
41000  11111111  11111111  11000000  00000000  00000000  00000000  00000000  00000000

42000
43000

44000
45000
```

```
4600
4700


5000
5100

5200
5300

5400
5500

5600
5700


6000
6100

6200
6300

6400
6500

6600
6700


7000
7100

7200
7300

7400
7500

7600
7700
```


BIT01	3035	IN1B	1420	K0077	3243	SR06	2741
BITOUT	3031	IN2	1434	K212	3246	SRQ	6003
BITS	2646	IN2E	4004	K215	3245	START1	0202
BSW	7002	IN3	1466	K240	3250	START2	0244
CAF	6007	IN3A	1472	K336	3247	TIOT	0250
CNTR1	0020	IN3E	4012	LOOP1	2667	TRAN1	0460
CRLF	3513	IN4E	4027	LOOP2	2712	TRAN1E	3704
DATA1	0021	IN5	1600	LP1EXA	2677	TRAN2	0477
DATA2	0022	IN5A	1604	LP1EXT	2705	TRAN2E	3717
DATA3	0023	IN5C	1633	LP1EXX	2711	TRAN3	0516
DATA4	0024	IN6	1637	LP2EXT	2726	TRAN3E	3732
DATA5	0025	IN6A	1644	LPCNT	0031	TRAN4	0536
DATAP	2665	IN6C	1672	LSTDGT	3027	TRAN4L	3742
DATCNT	2664	IN7	1676	M1	3400	TRAN5	0556
DATOUT	2641	IN7A	1702	M2	3421	TRAN5	3752
DBCI	4435	IN7C	1735	M2A	3445	TRAN6	0600

```
DBCIX   0300            IN8     2000            M3      3476            TRAN7   0616
DBCO    4437            IN8A    2005            M40     3244            TRAN8   0634
DBCOX   0312            IN9     2030            MEP     3275            TYPE    3251
DBDI    4432            IN9A    2034            MESG    2634            TYPFLG  0030
DBDIX   0261            IN9E    4035            MQA     7501            TYPSET  3215
DBEI    4433            INIT1   0400            MQL     7421            XDBCI   0035
DBEIX   0266            INIT1E  3646            MSTDGT  3026            XDBCO   0037
DBRI    4436            INIT2   0416            MTP     3241            XDBDI   0032
DBRIX   0305            INIT2E  3662            OCTASC  3000            XDBEI   0033
DBRO    4441            INIT3   0435            OUT1    1000            XDBRI   0036
DBROX   0324            INIT3E  3675            OUT1E   3762            XDBRO   0041
DBSK    4434            INOU1   2200            OUT2    1033            XDBSK   0034
DBSKX   0273            INOU1A  2205            OUT3    1054            XDBSO   0040
DBSO    4440            INOU2   2230            OUT3A   1060            XERROR  0044
DBSOX   0317            INOU2A  2235            OUT4    1105            XLOOP1  0045
DH0     3515            INOU3   2260            OUT4A   1111            XLOOP2  0046
DH1     3516            INOU3A  2265            OUT4E   3770            XPRINT  0042
DH2     3526            INOU4   2325            OUT5    1200            XTYPE   0043
DH3     3535            INOU4A  2331            OUT5A   1205
DH4     3561            INT1    2400            OUT6    1230
DH5     3576            INT1A   2404            OUT6A   1234
DH6     3622            INT1AE  2431            OUT7    1262
DHDER   2636            INT1BE  2446            OUT7A   1266
DIOT    0260            INT1CE  2453            OUT7E   3776
EHALT   2654            INT1D   2441            OUT8    1315
EPAS1   3272            INT1E   4043            OUT8A   1322
EPASS   3257            INT10K  2437            PNTR1   0253
ERADR   3025            INT2E   4054            POINT1  0010
ERRAD   2666            INT3    2460            PRINT   3200
ERROR   2600            INT3A   2464            SPLIT   3012
FJUMPE  0027            INT3C   2506            SR00    2733
IJUMPE  0026            INT3E   4066            SR01    2734
IN1     1400            INT4E   4100            SR02    2735
IN10    2063            INT5E   4113            SR03    2736
IN10A   2070            INT6E   4117            SR04    2737
IN1A    1403            IOTS    0247            SR05    2740

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ERRORS DETECTED: 0

LINKS GENERATED: 18

RUN-TIME:  18 SECONDS

3K CORE USED
```